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FRONT COVER

Indian Market

Cereals are the staple of the Indian diet, supplemented by vegetables such as these on display in a market at Agra. (Photo courtesy of Rae G. Engebretson.)

BACK COVER

Chart Showing Acreage and Production of Seven Food Grains in India

India is trying to increase the production of cereals because of the high consumer preference for them.

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NEWS NOTES

Far East Grain Mission

Findings of the Far East Grain Mission, back in the United States after a first-hand study in Asia, are attracting wide interest among grain producers and members of the trade. Special meetings were held last month at midwestern and northwestern milling centers to permit the Mission to discuss its findings with producer and industry representatives.

Members of the Mission are *Edward J. Bell,* administrator of the Oregon Wheat Commission; *Archie M. Camp,* president of the North Pacific Grain Growers, and *Henry A. Baehr,* cereals chemist and marketing specialist, United States Department of Agriculture.

Members of this Mission were well impressed by the demand for wheat and wheat products in Asia. Future imports of wheat by the Far East cannot be expected to approach the 170 million bushels imported in 1948–49, but the Mission believes the market for wheat and flour in that region will remain substantially above the prewar average of some 35 million bushels.

The Mission's itinerary included the following points: Japan, Hong Kong, the Republic of the Philippines, Singapore, Malaya, Indonesia, Thailand, India, and Pakistan. Members spent about 3 weeks in Japan, 3 weeks in the Philippines, 2 weeks in India, and about a week at each of the other points.

Their study was sponsored by the Office of Foreign Agricultural Relations in cooperation with the State of Washington and the Oregon Wheat Commission under the Research and Marketing Act Program.

FOREIGN AGRICULTURE — ALICE I. FRAY, EDITOR

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India Can Feed Itself

There is vast opportunity for farm improvement in India. Application of modern agricultural practices to even half of India's farms would eliminate the nation's 10-percent food deficit.

by HENRY W. SPIELMAN

Many aspects of Indian life have combined to give credence to the widespread belief that India's farms can never produce enough food for all its people. The population is increasing by roughly 4 million a year, most of the good land is now being farmed, agricultural production methods and tools have changed but little over the centuries, and farmers resist change. Nevertheless, India's agricultural scientists believe that the nation can feed itself. In its agricultural experiment stations it has the knowledge, and on its farms it has resources that are not fully utilized. In those areas where the two potentials have been brought together, farm productivity has been increased by 60 percent to as much as 400 percent. And a 10-percent increase is all that India needs to become self-sufficient.

The system of agricultural experiment stations throughout India has been in operation for a number of years. Many of the stations are staffed with specialists trained in the United States or Europe and all of the stations have been highly successful. They have developed new crop varieties, improved plowing and cultural practices, developed water- and soil-conservation services and drainage programs, and introduced irrigation farming and land reclamation.

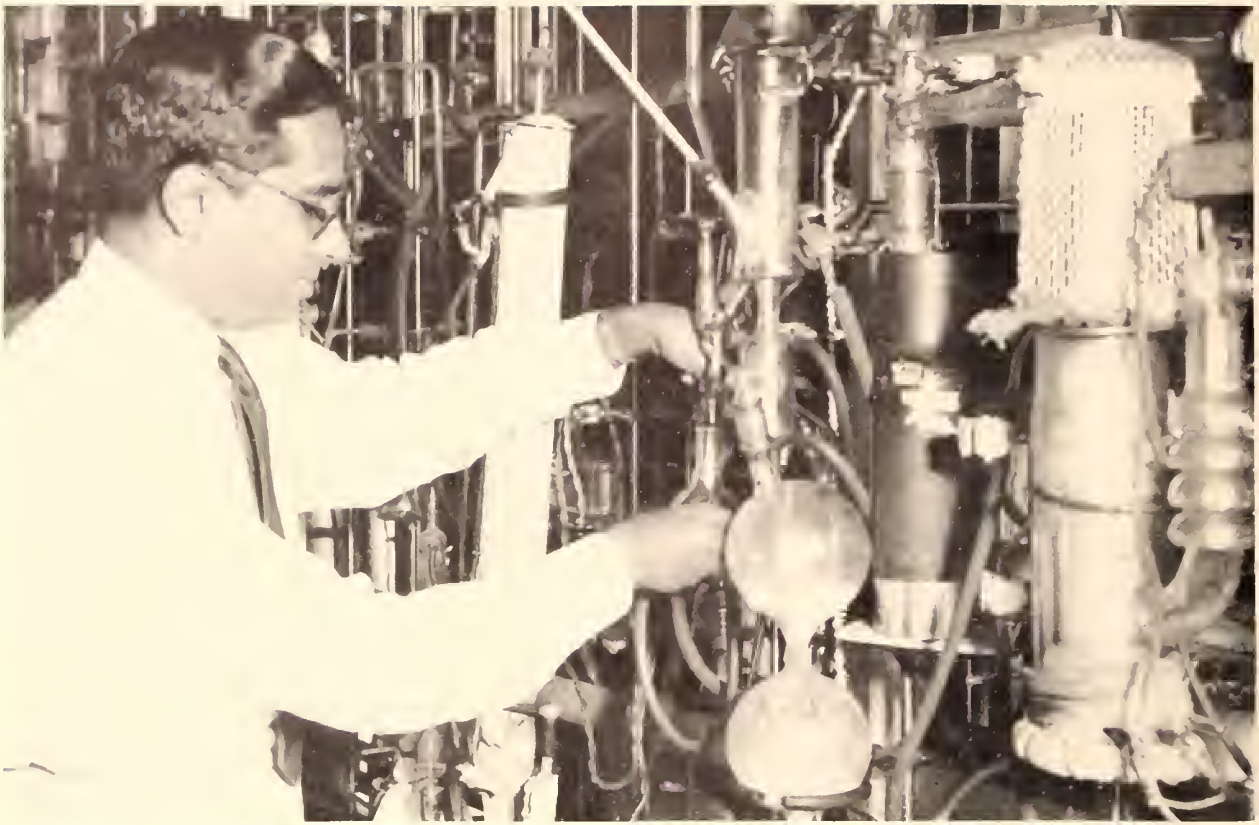
Station experiments have shown that by using improved varieties, farmers can increase yields by an average of 12 percent. If they also use manures and commercial fertilizers, they can increase them 25 to 75 percent. And if, in addition, they use slightly improved indigenous farm implements, space crops in accordance with rainfall and soil conditions, and plant and cultivate at the proper time, they can increase output 20 to 50 percent more. When all improved methods were used on one plot of an Indian farm, production was increased by 400 percent.

The Sholapur experiment station in the Deccan area of India reports an interesting example in its cooperative arrangement with a farmer on a dry hillside nearby. The farmer agreed to follow the station's recommendations in his 15-acre grain sorghum field, from which he had been getting an average yield of 150 pounds an acre. He was to use his own equipment.

His first step was to terrace the field to conserve both the soil and the moisture. Next, he prepared it for contour planting. Then he planted seed of the improved variety furnished by the station and spaced both the rows and the plants in the rows as recommended. Compost and chemical fertilizers were applied. When the crop was harvested, the

Life in India is a constant struggle to get enough to eat.

Mr. Spielman, Agricultural Attaché, American Embassy, Karachi, Pakistan, was Consul (Agricultural), American Consulate General, Bombay, India, when this article was written.



India's agricultural science, in laboratories and experiment stations, is modern and progressive.

farmer was amazed at the yield—660 pounds an acre.

The director of the station is convinced that similar results could be obtained by most farmers in the Deccan area.

India's agricultural scientists, then, do have the know-how for solving the country's food problems. The question remains how to bridge the gap between the experiment station and the farmer. The answer, of course, lies in extension services. These, too, India has, but thus far they have reached few farmers.

Extension services are probably best developed in Bombay Province, where there is an agricultural agent and 3 or 4 assistant agents in each of the 19 districts. Each assistant supervises 3 to 5 village workers, who live with the farmers and pass along the latest recommendations of the Department of Agriculture. Because of the limited number of extension workers, only a small percentage of Bombay's farmers can be reached. Those who are getting up-to-date farming information and learning to use it are getting increased yields well above those of their nonparticipating neighbors. Undoubtedly production of all types of food grains could be increased in a few years if there were enough trained extension workers.

Although India's farmers tend to cling to the traditional ways, Indian agriculture is not so static as it might appear to a casual observer. Changes are taking place. For example, 10 years ago, farmers of the Gujerat district of Bombay Province were raising their own bullocks. Now they get them from commercial cattle raisers because farmers realize that, with young bullocks requiring 4 years of costly care and training before they can be of use, it is cheaper to buy them already trained. Another example is to be found in the region around Anand, also in Bombay Province. Ten years ago, this area was producing only enough milk for local consumption. Last year, even in the February-March off season, the region sent 57,000 pounds of milk daily to the Bombay city market.

All this evidence of progress and change indicates that India is moving toward a modernized agriculture and a solution to its food problem. It will not be an easy or quick solution, however. India has 340 million people to feed, and the population increases by about 4 million a year. According to Indian food authorities, at least half of the population gets less than 1,200 calories of grain a day. This diet, however, is supplemented by other foods. Indians eat some sugar in the form of *gur* (cane juice, boiled down until it forms crystals; *gur* is generally sold in blocks of 2 to 40 pounds). In addition, they have chillies, potatoes, pulses, clabber, nuts, and, in some areas, cabbage, eggplant, or cauliflower. Only about 25 percent of the people eat meat, generally mutton, fowl, or fish. It seems safe to assume that nearly all Indians have at least the subsistence diet of 1,800 calories a day.

In India as a whole, food grains probably represent 60 to 75 percent of the diet. In some areas they make up 90 percent and in others about 45. Other sources of food are merely supplementary. The Government would find it difficult to change eating habits. Therefore most of the increased production will have to be in food grains. When the rationing system was most strict in India, there was a large black market in food grains. It grew out of the strong preferences that various groups have for specific grains. For example, when the ration was composed of, say, 40 percent wheat, 40 percent rice, and 20 percent other grains, those who preferred rice would sell their other grains and buy rice.

Another custom that affects the general productivity of Indian farms is that of maintaining thousands of unproductive cattle on them. India has one-third of the world's cattle, but nearly a third of these either do not bear young or are unfit for work. Nevertheless, most Indian farmers will not part with their cattle. They have a religious objection to slaughtering unproductive animals and regularly make efforts to preserve all of the cattle. The Bombay Legislature recently passed a law prohibiting the slaughter of cattle under 15 years of age.

The fragmentation of Indian farms too has some effect on agricultural efficiency and therefore on the country's ability to feed itself. Few farms are a single unit. The farmer with 5 acres may have five different plots of land scattered over 2 square miles. He spends considerable time and animal power mov-

India's problem is that most farmers never hear of the new developments in agriculture.

ing from one plot to another. Some of the Provinces have passed legislation to correct this waste. Bombay Province, for example, has fixed 5 acres as the minimum size of a plot. This law also provides that when a holder sells his land, if it is smaller than that minimum and his neighbors also have less than the fixed minimum, he must sell to one of his neighbors.

Indian farms vary in size with the kind of principal grain they produce. The average rice farm in Bombay Province is 5 acres, while most jowar-grain sorghum farms consist of 30. Of course, in many places rice farms may be only 2 or 3 acres or, sometimes, only 1. Generally a family farm is the size that an able-bodied man with a grown son and two pairs of oxen can farm. Indian agricultural specialists believe that with the present type of farm power, this small unit is the most economic.

A trend that is disturbing Government officials is the migration of the more aggressive and enterprising young rural people to cities. One official cited this movement as the major reason for improving living conditions on farms and in villages. He stated that farming must be made as attractive as urban life, from both economic and sociological standpoints, if the better people are to remain on the land. It will be the more aggressive and enlightened farmers who will use the results of research and lead their neighbors to increased food production.

Perhaps the most important factor that makes it difficult for India to feed itself is the psychological attitude of the farmer. He will not change his ways readily. His reluctance is understandable. Indians have been farming their land for centuries. Through trial and error they think they have found ways to feed themselves despite floods and droughts. Their methods have been in use for generations and consequently they question change. Even in the most backward areas, however, farmers are responding to new and improved methods when such methods are effectively demonstrated.

Many of the aspects of Indian life that stand in the way of a highly efficient agriculture are rooted deep in religious beliefs and in tradition, and the Government will not find them easy to change. But increasing production to a level of self-sufficiency would not necessarily require any radical change in the social or economic conditions of the farmer. It calls only for making better use of his resources. India's food deficit is only 10 percent of total production. If the improved methods can be used on 50 percent of the farms, the country could feed itself. The other problems will eventually have to be faced and solutions found before agriculture can be on a continuously sound basis. The immediate problem is making two blades grow where one grows now. And this can be achieved by extension services that can effectively get the results of research from the experiment station to the farm.

Salvador's Coffee Farms Discard Old Practice

By MARIO LEWY VAN SEVEREN

Central American coffee production continues to assume more of the proportion of a true agricultural science as an increasing number of factors affecting the crop come to light. In El Salvador, for example, experiments at the Centro Nacional de Agronomía reveal that a half-century-old practice—the digging of abono holes—not only wastes much time and effort but even harms the trees.

Briefly the abono, or fertilizer, hole is an excavated area, usually some 3 feet square and equally deep, the nearest point of which is usually about a yard from the base of the coffee tree. Soil excavated from the hole is spread in the immediate vicinity. Falling leaves from both coffee and shade trees, twigs and small branches from pruning, and weed growth resulting from clean cultivation are collected and dumped into this hole. Once the hole is filled, a new one is dug on the opposite side of the tree. When this is filled, still another is dug halfway between the first two. The process is repeated until eventually the coffee tree is encircled by a moat filled with an accumulation of organic matter.

The use of abono holes is gradually disappearing in El Salvador, but this is attributable to economic factors—increased labor cost—rather than to the scientific evidence arrayed against the practice.

The most common reason advanced by coffee growers in support of the practice is that it adds humus to the recently formed volcanic soils, usually low in organic material, and quickly furnishes nutrients to coffee trees through composting. Recent interest in

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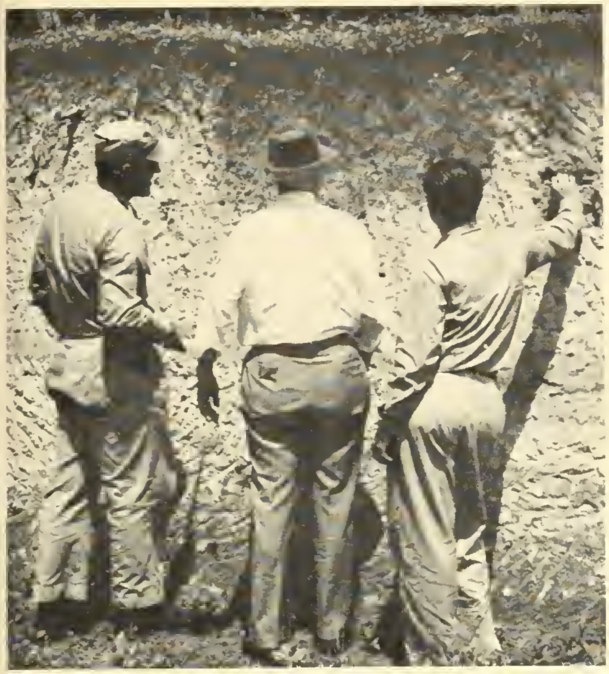

Abono holes are often more than 6 feet deep.

soil and water conservation has given rise to another explanation for use of abono holes. Coffee planters claim that the practice prevents the loss of soil and nutrients and that the hole acts as a storage reservoir for water that would otherwise be lost in the rainy season. As a matter of fact, abono holes are probably used because they offer the quickest and most economical means of removing the vegetal litter that impedes recovery of the few coffee cherries that fall during harvest.

Studies of coffee cultural practices by the Centro have demonstrated that the practice is based, almost entirely, on false premises. Roots severed during the excavation of a hole seldom regenerate. Several years after a hole is filled few roots can be found in it. Coffee has a shallow feeding root system located almost entirely in the upper foot of soil. Thus, even when the feeding roots, cut in excavation, regenerate they fail to penetrate to the depth at which most of the nutrient material and water is stored.

A companion practice to abono holes, clean cultivation is also generally followed on Salvadoran coffee plantations. Weeds are cut with a scythelike tool known as a cuma. Some of the superficial roots are severed too. After the litter is put into abono holes, the bare soil and severed roots are exposed to the action of water, wind, and sun, offsetting any value of the hole itself from the viewpoint of soil and water conservation.

Chemical analyses of decomposed organic material in abono holes of varying ages have shown that there is an abundant supply of plant nutrients in the holes. Analyses have also shown, however, that there is almost no leaching of nutrients from the hole to surrounding soil nor any appreciable movement from the lower layers to the surface. Thus, even though abono holes do act as a storehouse for plant nutrients, little or none of the plant food ever becomes available to the coffee tree because of its shallow feeding root system.

In its studies carried out during the past 2 years on the effect of cultural practices on yields the Centro has conducted some experiments on mulching. The mulch was formed by placing a thin layer of legume straw on a plot on which leaves and litter from coffee and shade trees were allowed to accumulate. As a result of this method, the soil around the coffee roots was undisturbed, an organic mulch was spread uniformly over the soil, the root system was not cut, root development was unhampered, and yields increased 100 percent. It is evident that the accumulation of a natural mulch produces all the effects claimed for the abono holes without the cost of digging the holes and without destroying feeding roots. More important, the plant nutrients are in the upper surface and in contact with the root-feeding system.

Coffee growers in El Salvador have been impressed by the results of this research at the Centro Nacional de Agronomía, and already some are abandoning clean cultivation with its abono holes.

A NEW TOMATO VARIETY, resistant to Fusarium wilt, is receiving considerable interest in South Africa. The variety, known as Durbot, is not yet running true to type, and selection work is expected to continue at the Nelspruit Subtropical Research Station, Transvaal, until it is running true. When ready for general distribution, it should prove a boon to growers in the low veld areas of the eastern Transvaal where Fusarium wilt is particularly severe.

The new tomato is a bright-red, flat-shaped fruit, deep, oblate in shape, and 3 to 4½ inches in diameter. Research workers have noted that the fruit is not always firm and the strength of the plant leaves something to be desired, but they hope that further breeding work will overcome these difficulties.

The original plant selection, 3–S–12, was developed at the Missouri Experiment Station in the United States and sent to South Africa in 1940.

FAO and World Food And Agricultural Policies[*]

by F. T. WAHLEN

The word "policy"—and "politics" for that matter—is derived from the Greek word *polis*, meaning city-state, and signifies the care for matters of common concern to a community. In this sense, it means cooperation. Now I would suggest that if international cooperation was impossible in a field such as food and agriculture, which is of the most direct interest to every man, woman, and child on this globe, then it would be hard indeed to think of any other kind of human endeavor where international cooperation could function. The Food and Agriculture Organization has been given a mission that includes, by the will of its founders and of its Member nations, three main tasks:

1. To raise levels of nutrition and standards of living;
2. To improve the production and distribution of all food and agricultural products; and
3. To better conditions of rural populations.

These aims cannot be realized without international cooperation, and this cooperation must ultimately lead to international policies.

Possibilities of International Cooperation

Today, the interest of the public in general, and of farmers in particular, centers around international commodity agreements or still more ambitious schemes such as a World Food Board or the International Commodity Clearing House recently proposed by the FAO Secretariat. However, international collaboration, along with any other worthwhile thing, must be allowed to grow organically. Every opportunity, however modest, should be utilized in order to gain experience and to get peoples and their legislatures used to thinking in broader than national terms. In this endeavor, such attempts as the common fight against insects and pests of economic crops and against animal diseases, the common protection of watersheds, and the concerted utilization of waterways and ocean fishing grounds have considerable merit, not only in view of their immediate aims, but also for the strengthening of bonds between nations in order to allow the tackling of more ambitious schemes.

Lastly, it must not be overlooked that international policies cannot be evolved and become operative in a vacuum. They are nothing more than the respective foreign departments' ends of the internal policies administered by the departments of agriculture, of commerce, and of finance. For this reason FAO is vitally interested in these national policies.

Past Attempts at International Cooperation

In looking over the brief history of what may be called the groping of governments to find a way to international policies in food and agriculture, one is heartened by the many worthy initiatives taken, even though not all of them have matured into permanent usefulness. Without any attempt at universality, and merely by way of examples, let me cite a few.

As early as 1864, an international sugar agreement was signed in London. In 1881, a subject that brought nations together was a dangerous pest that threatened to destroy the European vineyards—I refer to the Phylloxera Convention, signed in Bern, Switzerland, in 1881. Sugar was again the subject of a commodity convention in Brussels in 1902, and many later agreements deal with this product. Since about 1930, wheat has claimed the foremost place in international attempts to bring about order and stability in production and marketing. To go back again to the beginning of this century, an American of Polish extraction, David Lubin, conceived the idea that the nations of the world should create a permanent center of agricultural cooperation. He vainly approached half a dozen statesmen of as many countries with a request for help, until he succeeded in persuading the King of Italy to take the initiative for the foundation of the International Institute for Agriculture in Rome, in 1905. It was not primarily intended that this Institute would formulate common agricultural policies of the adhering nations. It

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[*] Based on an address before the U. S. Department of Agriculture Graduate School.

acted more in the capacity of a statistical and information center, pursuing studies that proved useful for the shaping of the Member countries' national policies and providing an opportunity for the leading agricultural executives to meet periodically.

Still more recent are the first attempts at improving nutritional levels through international efforts. They have their roots in the experiences during and immediately after World War I. More forcibly than ever before, war experience had drawn the public attention to the widespread undernutrition and malnutrition prevalent even in advanced countries. Yet, barely 2 years after the close of that war, countries exporting agricultural commodities began to feel the effects of oversupply on the market, and it became more obvious than ever that the underlying cause of the disturbance was underconsumption rather than overproduction. Three men who are still with us—Sir John Boyd Orr, today Lord Orr and incumbent of the Nobel Peace Award of 1949; Lord Bruce of Melbourne, the present independent chairman of FAO's Council; and F. L. McDougall, Counselor of FAO—proposed to the League of Nations the idea of safeguarding public health and improving social conditions by means of internationally influencing public food policies. On the basis of some preliminary work done by the League's International Labour Office and its Health Section, the League established a Mixed Committee on Nutrition. This Committee has done valuable work by drawing the attention of governments to problems that had long been overlooked.

In the field of national nutrition policy, reference must be made to the first school-feeding schemes established in England in 1906. This lead was vigorously followed by the United States during the crisis of the 1930's, when that country found itself struggling with farm-produce surpluses on the one hand and malnutrition in low-income families on the other. The food-stamp plan, effective between 1939 and 1942, and the still-operating school-lunch program are the two most outstanding developments in this field.

FAO's Influence in Shaping International Policies

In the nature of things, international development can never be ahead of national policies. In appraising the possibilities of action on the international level, FAO must take into account the state of public opinion as expressed by national legislation in any given field. A mere stock taking, however, would not be dynamic enough to bring about the necessary changes. FAO has a definite responsibility in influencing Member governments. How can it exercise this influence? Obviously, international agencies are not in a position to impose patterns of national policies that would fit into an intelligent world policy. In joining agencies such as FAO, countries give up none of their national sovereignty. All must be done by persuasion. In order to persuade, one must present facts and figures, and FAO's statistical services, commodity bulletins, and consumption appraisals are instruments to this end. These facts and figures are brought together yearly to a coherent over-all picture in the FAO publication, "The State of Food and Agriculture," for the information of governments and as a background for discussion at our annual Conference. In our time, not only countries but continents have been brought so closely together by the ever-improving means of international communications that intelligent national policies can only be evolved against the background of world conditions.

FAO has a further responsibility with regard to the conservation and judicious utilization of natural resources. The unevenness of their distribution has been a source of strife and wars in all history. We are concerned not only with ways and means of making them available to all nations but also with their conservation for the generations to come. Look at a world forest map. There are two belts of intense forest density—one in the north; one in the Tropics. The most densely populated temperate region, which is the greatest consumer of wood, has the least of this important commodity. FAO is the meeting ground of nations to evolve a world forestry policy.

Or, think of the great food potentialities of oceans, shared only by countries fortunate enough to have direct access to the sea. FAO has established Regional Fisheries Councils, and these ultimately should bring about what I should like to call ocean husbandry, instead of uncoordinated exploitation of ocean resources. Another pertinent example is the common protection of watersheds, with the threefold purpose of preventing wanton destruction of soils by erosion, of regulating water flow so as to divert steady streams for irrigation, and of developing hydroelectric power.

A potential field for international cooperation is the coordination of research. Agricultural sciences have become extremely complex, and each new discovery, each new step toward unexplored horizons make for further complexity—hence the need for specialization. And this in turn calls for coordination in order to plant guideposts for the specialist about to push ahead in a small segment of a very widespread front. Everywhere the need for national coordination is recognized. The task of coordination is difficult even on a national level, and yet, in spite of still greater difficulties, it must be tackled internationally. Most countries must adapt their research programs to the limited means available, both in funds and personnel, and can select only a certain number of projects out of a long list of desirabilities. By combining efforts with research institutions of neighboring countries, with a sensible division of work, and by arranging for mutual exchange of information, much better results can be achieved and much waste avoided. FAO endeavors to help in bringing workers together on a regional basis and by generally fostering the spirit of cooperation.

The examples mentioned so far are but a few of a long list on which we are working, and they lead up to much bigger issues that overshadow international food and agriculture policies today. It has been said that one of FAO's important functions is to act as an international extension agency. This is true in a sense, and as far as it is true we meet with the same difficulties today that the United States Extension Service encounters. This Service is busy telling farmers how to improve and increase their production. Other services of the same Department of Agriculture are equally busy trying to dispose of unmarketable stocks of eggs, dried milk, potatoes and to work out production restrictions on wheat, tobacco, and peanuts and possibly on cotton, and even on corn. Of course, FAO is in the much happier position of being able to exercise its function as a World "County Agent" in countries and regions where production is much below consumption levels. The existing gap is so great that local surpluses need not be feared for many years to come. But seeing the over-all situation, the paradox of unmarketable stocks piling up or rotting away in one country and of populations chronically underfed in others is by far the most disturbing factor in our field of activity. Aside from the political difficulties of our period, it is probably the biggest issue with which the world is faced today.

The man in the street finds it increasingly difficult to understand this tangle. It does not make sense to him to read in the same paper of food being destroyed in one place and of millions being hungry in another. He grows impatient at being told of all the intricacies behind this state of affairs, of the interrelationships between surpluses and trade, of government price support, social security for farmers, production programs, labor protection, and finally the key to so many of today's evils, the dollar shortage and other currency problems. There is an increasing number of responsible citizens in all countries who expect their governments to untangle these knots, and there is increasing insight that this untangling can be done by international cooperation only. Historically and factually, there is a series of steps that will lead to the solution. The commodity agreement step covers only part of the ground. Let's take the International Wheat Agreement as an example. Its conclusion a year ago was certainly a step in the right direction, but it is as yet far from the goal. For one thing, only half of the wheat annually moving in international trade falls under the Agreement, and it disregards the intimate connections between the wheat market and the market of other coarse grains. The main shortcoming is that no attempt is made to overcome unbalanced trade conditions between countries, and the resulting currency difficulties. It does afford, however, a certain stabilization of prices and a certain security for exporting and importing countries.

With its projects for a World Food Board in 1947 and an International Commodity Clearing House in 1949, FAO went some bold steps further. It proposed that all nonperishable staple commodities be handled under the Charter of ICCH. Pending the reestablishment of multilateral trade and freely convertible currencies, ICCH was designed to provide the machinery for bringing goods to countries that need them but cannot buy them because of lack of hard currency. No country could have been forced to sell or buy under its Charter, but any two adhering countries could have agreed to transfer surpluses in spite of currency disequilibriums. The Commodity Clearing House would merely have satisfied itself that such transactions represented *additional* trade and not substitutions for normal commercial sales.

Any such scheme has its disadvantages. A special committee appointed by our last Annual Conference spent many days carefully going into the whole scheme, and all the difficulties were minutely brought to light and analyzed. It was shown that the amounts in soft currencies that the ICCH would have to accept might build up to very large sums before the beneficial effects of expanding trade might allow their free movement. Some feared possible interference with the normal channels of international trade. These difficulties and others had not, of course, been overlooked by FAO and by the experts it had drawn from all parts of the world to study this proposition. If there had been an easy solution, surely it would have been found and put into effect long ago. We simply must face the fact that this question of fundamental importance, as well as any other really worthwhile undertaking, entails difficulties that require a bold approach. Our Conference was not able to accept the plan put before it. Instead, a special FAO Commodity Committee was appointed. This committee is of an advisory character and can merely act as a means of bringing surplus and importing countries together, subject to their finding their own terms. Meanwhile, unmarketable stock piles continue to grow, and undernutrition persists. Is there any greater challenge for our economic and social order?

Surely, this cannot be our last answer. We have learned to dispose of many things that were considered part of the natural order a generation ago. We have learned that individual liberties have immanent boundaries drawn by accepted moral standards and are willing to respect these boundaries in order to protect the rights and interests of others. We are in the process of learning that free enterprise is the best form of economic activity only on the condition that its captains exercise their power with a high sense of civic responsibility and with sufficient regard for the economically weaker classes. It is today a generally accepted function of the state to erect the necessary safeguards to this end. All this has been brought about by the gradual sharpening of the social conscience of nations, and I would say that this is one of the really heartening features of our time. I am sure that this development will continue and that it will gradually find its expression in a bolder and more concrete international cooperation. The program of Technical Assistance for Economic Development is one expression of this growing tendency. Its implementation will provide the greatest opportunity in the history of mankind to evolve a sound common husbandry in dealing with the riches of the world for the common good of all. The provision of scientific knowledge and technical skill will have to be followed by a sound international investment policy.

This in turn, if it is to make sense, is dependent on and calls for a removal of many of the existing trade barriers and for a gradual return to free convertibility of currencies, and these steps will go a long way toward removing the appalling and unbearable differences in the living conditions of different peoples. True, all this is contingent on the preservation of peace. But conversely, might it not be just as true that the preservation of peace is contingent on the will and the ability of statesmen to cope with these problems? Admittedly there is as yet no course mapped out that will infallibly lead to success at the first attempt. All we can say is that here is one task that can only be solved by international cooperation: that a courageous, even though imperfect, attempt to find a way by trial and error is much to be preferred to inactivity born of fear and national selfishiness.

Rice for Greece's "Wastelands"

An important phase of raising food output in Europe is the technological assistance that is being given by the Economic Cooperation Administration in introducing new crops to many of the Continent's farmers.

One of the most notable achievements has been in rice production in Greece. Here, new rice fields, built and planted in 1949 on alkali and salt flats, which have been totally barren since before the time of Christ, are yielding a minimum of about 82 bushels to the acre. The monetary return on these fields, which were harvested with modern combines, should amount to about $440 an acre at late 1949 domestic rice prices and at the devalued drachma rate of 15,000 drachmas to the dollar.

Rice is being grown on wasteland in five different areas in Greece. By 1952 a domestic yield of 26,250 tons, barely enough to cover Greece's own needs, is expected. The goal for 1959 is a 50,000-ton yield. Greece is now a heavy importer of rice, and its needs represent an annual expenditure of millions of dollars of badly needed foreign exchange.

The rice-introduction work was begun in 1947–48 under the direction of Walter Packard, a member of the American Mission for Aid to Greece. By 1949 the rice fields had been leveled, bordered, ditched, and planted. Seed was provided by the Greek Ministry of Agriculture with the assistance of the ECA Mission to Greece. The return from the 1949 crop is not only paying for the projects but also netting substantial profits. In 3 or 4 years the salt lands on which the rice is grown will be cleansed by constant fresh-water washing so that such other crops as wheat can be grown. There are also about 250,000 acres of alkali wasteland, now worthless, that can be reclaimed and put to work producing food in Greece.

Agricultural High School In the Philippines

Harvesting rice. Luzon's students learn by doing.

His poultry project enables him to earn as he learns.

In its Central Luzon Agricultural School, now in its fortieth year, the Philippine Islands have a model vocational high school that graduates hundreds of young farmers and homemakers every year. The school is a practical institution where, for much of their school life, boys and girls live and work as farmers and earn their education.

The school was founded by the National Government in 1907 on a keynote of fitting pupils "for useful employment and to meet the needs of persons over 14 years of age who have entered upon or are preparing to enter upon the work of the farm or home."

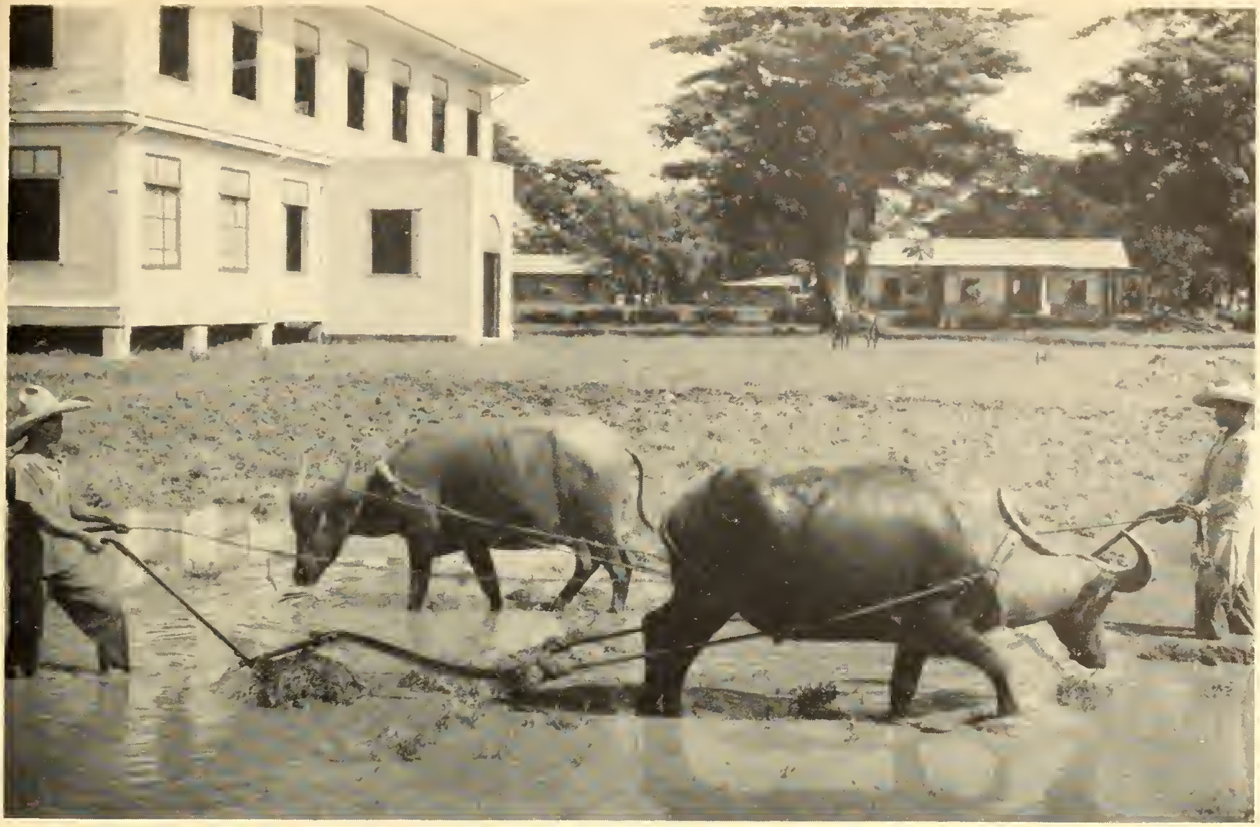
The Luzon school had an humble beginning. For years, it was unpopular, considered a "poor man's school," because it emphasized vocational education. As time went on, however, its true value asserted itself until today it has taken its place among leading vocational agricultural high schools of the world.

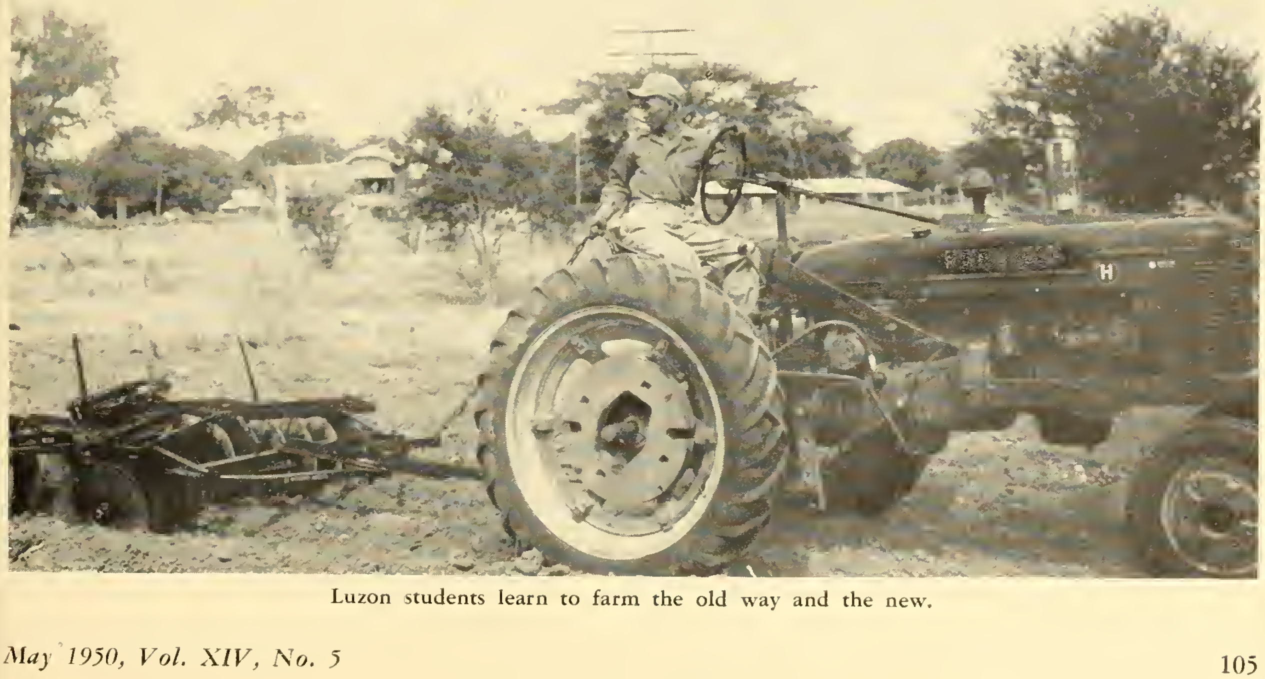
Students earn as they learn at the Luzon school. Thus, boys and girls from low-income families can attend. Although the curriculum stresses on-the-job training in agriculture, students also have classroom instruction in such usual high school courses as grammar, science, history, and mathematics.

The 1,600-acre school has all the facilities of a city—shops, hospital, bank, post office. And like citizens of a city, students elect their mayor and council.

Freshmen and seniors live on the campus and carry out special projects as practical application and follow-up of classroom instruction. For this work they receive their meals. Second and third year students live like farmers, in cottages around the campus. They receive 75 percent of their rice crop and income from other crops and livestock that they raise for study or profit or as a hobby.

The school maintains the farms and equipment—the 119 seven-acre rice farms, the vegetable and flower gardens, an orchard, two nurseries, the several breeds of pigs, goats, and chickens, the work stock, and the machinery department. Students furnish the labor under supervision. And they gain skills and develop a resourcefulness that equips them for progressive farming and homemaking and for further education.





Luzon students learn to farm the old way and the new.

Soil Conservation and Irrigation in Israel

by A. REIFENBERG

To help feed its greatly expanded population and reduce costly food imports, the young state of Israel early embarked on long-term projects of reforestation, soil conservation, and irrigation. In a country like Israel, where the land has long been neglected, these projects are essential to increased food output.

Recent events too have intensified the food problem. The Arab-Israel war severely damaged citrus groves, which had provided the principal export crops of the country, and forced farmers to abandon olive groves and vineyards. And the mass migrations of the past 2 years have increased the population by 50 percent.

To the 350 villages and settlements established within the past 70 years of Jewish colonization, 130 more were added in 1949 and 150 more are planned for this year. Twenty or thirty of these settlements will be in reforestation areas, but the majority are intended for the absorption of immigrants into agriculture. This settlement program is of primary importance not only for the immigrants concerned but also for the economy of the country as a whole.

Prewar Palestine was never self-sufficient in food, and Israel's trade balance has worsened because of the abandoned Arab holdings and the great influx of immigrants. In 1949, Israel imported roughly 23 million pounds of food, about a third of which was grain and flour. Grain, meat, and feedstuffs will probably have to be imported for some time, but it is entirely possible that, in the not too distant future, the country may be self-sufficient in dairy products, eggs, fish, and vegetables.

The Government has embarked upon a 4-year plan under which it hopes to treble the present acreage in vegetables and fodder, double the number of livestock, mainly those for milk production, double the area of fish-breeding ponds, and quadruple deep-sea fishing. Sugar beets will be grown and a sugar factory is planned. Oilseed crops will be introduced on a large scale. A superphosphate factory is already working, a nitrogen plant is planned, and it is hoped that potash production from the Dead Sea will soon be resumed.

Such development plans require not only that the modest present soil reserve—about 1.5 million acres of cultivable land out of a total of 5.1 million—be handled most efficiently but also that new land be brought under cultivation by irrigation.

Soil Conservation and Reforestation

To accomplish this husbanding of the soil, the Ministry of Agriculture has set up a Soil Conservation Service, with sections on planning, engineering, field-fire precautions, range improvement, land-use capability, and photogrammetry.

It is planned to introduce soil-conservation measures (contour plowing, terracing, etc.) on an area of 60,000 acres a year. These areas will be under constant supervision by the Ministry. A basic land-use-capability map is in preparation. Sixty settlements are now under complete erosion control and another 120 will soon be added. An experiment station for the measurement of run-off and erosion under different conditions is being constructed. A field-fire-prevention service has been installed on a countrywide and local scale, and a very strong law has been introduced to protect farms and forests against fire. Numerous observation points and mobile wireless-equipped patrols assist the Ministry in its endeavors. Experiments on pasture rotation are under way and, especially because there are still many goatherds in the regions, a law against overgrazing is in preparation.

At the same time an ambitious 10-year program for reforestation has been drawn up. It is estimated that about 800,000 acres of uncultivable soil can be planted in trees. This reforestation program will not only help to conserve the soil but will also provide constructive work for new immigrants, involving as it does 50 million working days. To ensure year-round employment, workers will undertake land im-

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provement in winter and terracing and destoning in summer. Although reforestation is non-revenue-producing for the time being, its importance for the absorption of immigrants and for the future welfare of the country is immense.

Irrigation

The creation of irrigation facilities is of paramount importance for Israel since irrigated land gives much higher returns and makes it possible to farm the now desertlike regions. Considering the adverse trade balance of the country, the provision of new irrigation facilities will be highly important to the economy.

It is obvious that modern technique provides far greater possibilities for irrigation than was ever possible in ancient times. For example, modern well boring, electric power, and up-to-date engineering methods have been used to develop 72,000 acres of the coastal plain for citrus plantations. Due to World War II and the Israel-Arab war, however, only about 30,000 acres are now cultivated and of these only about 25,000 acres are in bearing. The Government intends to rehabilitate the groves and to increase production by providing fertilizers, pumping equipment, and tractors.

Citrus irrigation is by direct surface flow, but most irrigation in Israel is done by overhead sprinklers. This system has been highly developed and is considered much more economic.

As to the future, we have to distinguish between long-range irrigation projects and much more modest plans that are included in the Government's 4-year plan. An important long-range project is the "Jordan Valley Authority" (TVA on the Jordan) first envisaged by Dr. Lowdermilk, former assistant chief of United States Soil Conservation Service. The "JVA" aims at the simultaneous creation of power and irrigation possibilities. The technical details and a proposed general plan for irrigation of the former territory of Palestine have been worked out by Hays and Barekette under the auspices of the Commission on Palestine Surveys. The principal aims of the JVA are the diversion of the sweet waters of the Jordan and its tributaries for irrigation and the utilization of the deep incline of the Jordan Rift Valley for power development. The annual amount of irrigation water carried through the canals would come to more than 1,600 acre-feet, an amount sufficient to irrigate more than 600,000 acres of agricultural land in the former territory of Palestine. Total power development would be roughly 660 million kilowatt-hours a year.

The coordinated program of power and irrigation development is envisaged in eight stages, of which the most interesting ones are the diversion of the Jordan flow into a concrete canal and the construction of a Mediterranean-Dead Sea Canal, the main power project.

In the meantime a number of minor irrigation projects have been planned under the Government's 4-year program and are already partly under construction. At the present, pipe lines carrying water from the coastal plain to the Negev are being extended. In this way, it is hoped, the irrigated area in the Negev may be increased to 6,000 acres. This is, however, a modest beginning only.

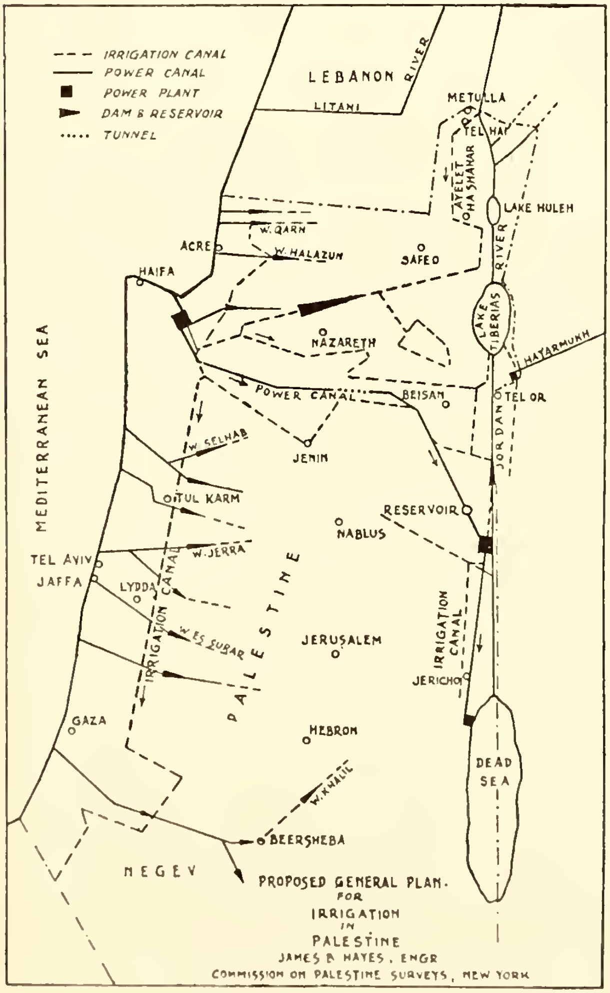
In the future the diversion of the small Yarkon River (north of Tel Aviv) to the south has first priority. Reservoirs for the floodwaters of the Yarkon and the tributary wadis are envisaged. Two pipe lines will carry the water to the irrigated areas. An eastern pipe line will approach the Jerusalem corridor to link up with the Jerusalem town supply and will then turn southward. The western pipe line will lead to the southern coastal area. It will take an estimated 2 years to build the pipe lines, which should carry enough water, after deducting town supplies, to irrigate 70,000

Soil conservation and reforestation are gaining new interest in Israel.

to 120,000 acres, depending on whether the land is partly or fully irrigated.

Better use of the springs in the Beisan region has second priority. It is estimated that after drainage of the area about 25,000 acres will be irrigated there. This project will take about 18 months.

Another project, the reclamation of the Naaman River area, has already started. Here 10,000 acres of malarial marshland near Acre will be drained and the river bed deepened and widened. A dam will be built across a nearby summer-dry valley for the storage of 5,000 acre-feet of water from winter floods. One feature of this scheme is that salts, accumulated in the soil through deficient drainage, will be leached when irrigation begins. Numerous other schemes such as the one in western Galilee, near the Qishon in the Harod Valley, and the one that will supply water over aqueducts to a number of settlements in the Jordan Valley are envisaged. There is also a project for storing winter floods in the summer-dry valleys along the coastal plain by the construction of dams. This project still requires investigation, however, so as not to imbalance the replenishment of underground water.



PROPOSED GENERAL PLAN
FOR
IRRIGATION
IN
PALESTINE
JAMES B. HAYES, ENGR
COMMISSION ON PALESTINE SURVEYS, NEW YORK

All in all, these projected schemes require an investment of more than $50,000,000, but the Yarkon and Beisan plans alone will double the present irrigated area of only 75,000 acres.

Soil Conditions

The reforestation, soil-conservation, and irrigation plans are all ambitious projects, many of which will take years to fulfill. But they are necessary because of the natural conditions of the country and its decline from its former agricultural wealth.

The most striking feature of the Israel climate is the occurrence of a well-marked season of winter rains. Four summer months are nearly, and three completely, devoid of rain. In the highlands and on the coast, rainfall may reach 20 inches or more, whereas most of the Jordan depression and especially the south (Negev) are desertlike. Violent rainstorms of a cloudburst type scour the loose earth from the slopes down into the summer-dry valleys, which in winter become filled with muddy, dark-colored, roaring torrents. In summer the scorching sun withers natural vegetation.

The Israel we see today is but the ruin of a once flourishing country. The change to desert conditions is not to be ascribed to a change in climate but to human mismanagement. Man has wantonly destroyed the original vegetation. Overgrazing and the burning of vegetation for the making of lime and charcoal as well as the ruthless exploitation of forests have denuded the country, exposing the soil to every form of erosion. The Bible leaves no doubt that Israel was far better wooded in antiquity. There were groves of oaks, terebinths, carobs, pines, cypresses, and sycamores, the latter having been tended in forests specially planted for timber. The plain of Sharon was covered by oak trees and bushwood until the time of the Crusades. Remains of oak forests are even today found in remote places. Vegetation and forests were destroyed because the type of agriculture fundamentally changed after the downfall of the Byzantine regime. Since then the desert has crept over the country. Whereas it was the ideal of the Jewish farmer that "every man should sit peacefully under his own vine and fig tree," the agriculture of the conquering nomads consisted mainly in the rearing of flocks. Not only did the goats eat the young shoots of trees and thereby impede natural regrowth, but they also destroyed the last remnants of shrubs and grasses by appropriating vast areas for grazing.

Contributing to the loss of vegetation and ensuing soil erosion was the decay of the old terrace culture in the mountains. Today most of the ancient terraces are in ruins, and instead of fertile slopes we meet with nothing but barren rock. When the slopes were still terraced, the winter rains flowed much more gently and steadily. On unprotected slopes the torrents cut deep rills and gullies, depositing the boulders and stones in the summer-dry valleys. The silt carried farther away was deposited in the plains and in many instances choked the outlet of watercourses into the sea. This process led to the formation of swamps and to the spread of malaria. The destruction of vegetation, on the other hand, also exposed the soil to wind erosion, especially in the south where dust storms are frequent. Far greater, however, was the danger to agriculture in the coastal zone, where today about 60,000 acres of once fertile soil are covered by dune sands. These dunes move inland at a rate of more than 7 feet a year. The magnitude of the processes involved may be studied at Ascalon, where the city walls, still 40 feet high in Crusader times, are now nearly covered by sand. Many once fertile lands, as for instance the neighborhood and ancient town of Caesarea, have become completely barren by this encroachment of sand dunes.

The run-off of storm water during an average year is about 400,000 acre-feet, showing a silt content of 1.4 percent. This means that more than 10 million tons of silt is carried down from the mountains every year. A soil layer of about 7 feet in thickness has been eroded within the past 1,000 years.

Ancient Irrigation Works

The same picture is represented by the ruins of ancient water installations. The skillful use of water resources was forgotten over the centuries, although water is of far greater significance in a country like Israel than in humid regions. In antiquity, settlement was possible only near springs and wells or where provision was made for storing winter rains. The porous limestone of Israel's highlands with its cracks, fissures, and caves does not allow for the emergence of many springs in the mountains. The greatest settlements in antiquity were formed along the foot of the Judean Mountains, where the "fountainheads" of the rain water seeping through the limestone gush forth or at localities in the plains where ground water was easily reached. Aqueducts brought water to fields and gardens in the days of the Romans, sometimes over great distances, and water mills were functioning near dried-out watercourses even a hundred years ago. All these aqueducts and water mills are today in ruins and so are most of the ancient reservoirs for storing water. Dams were built in antiquity across stream beds in order to impound the water of winter floods. These dams forced the silt, carried by floods, to settle and thus provided fertile soil. Today the ancient dams are neglected and destroyed. Instead of fertile fields we find a highly eroded landscape.

To turn desert into productive farming land, Israel plans to carry water hundreds of miles by pipe line.

It will be seen that the tasks confronting the Israel Government with regard to soil conservation, reforestation, and irrigation are tremendous. But they are not insurmountable. Let us hope that the day will not be far off when Israel will again be "a good land, a land of brooks of water, of fountains and depths that spring out of valleys and hills; a land of wheat and barley, and vines, and fig trees, and pomegranates; a land of oil olive, and honey; a land wherein thou shalt eat bread without scarceness, thou shalt not lack any thing in it."

Liberian Agricultural Progress[*]

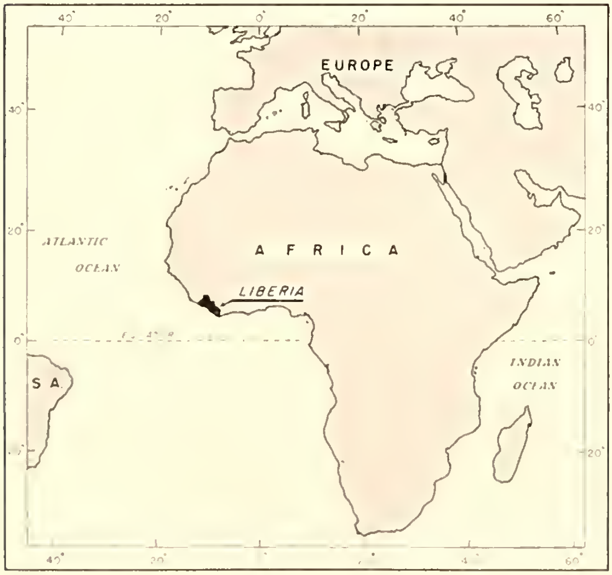
by DON LOOPER

A half decade of rapid agricultural advancement is paying off at mealtime for the Republic of Liberia. As a result, that West African democracy during the past year has become self-sufficient in production of its two principal food crops—rice and cassava—for the first time since the Republic was established more than a century ago by a group of American freedmen.

Liberia also is moving rapidly toward self-sufficiency in the production of vegetables, vegetable oils, pepper, yams, and tropical fruits. And it is hoped that soon enough poultry, hogs, and other livestock will be produced to supply the animal proteins now seriously deficient in the Liberian diet.

Sufficient land is available for the extensive production of food, but comparatively little use was made of this land as late as 1944, when Liberia imported 5,000 tons of rice from the United States and other surplus areas to supplement domestic production. Since then, however, rapid progress has been made through introducing improved agricultural practices, good seed, and pedigreed livestock.

Aiding in this advancement is the United States Economic Mission to Liberia[1] inaugurated in 1944. Also important are the Booker Washington Institute, a national institute of trade and agricultural training, and the Firestone Plantations Co., which represents the largest economic development in Liberia.



The Economic Mission has these primary objectives: (1) To make reconnaissance surveys of Liberian resources, (2) to give technical aid to the Liberian Government for development of those resources found to have development potential, and (3) on the basis of friendship, to formulate an integrated plan for the development of Liberia's over-all economy for the mutual benefit of Liberia and the United States.

Liberia is located on the southwestern tip of the West African bulge, less than 2,000 miles from Brazil. It has a population of about 1,000,000 and an area of some 40,000 square miles—about the size of the State of Ohio. The Republic was established July 26, 1847, the outgrowth of a colony founded by the American Colonization Society in 1822.

When the first settlers arrived, they found rice in wide use among the natives, and that commodity is Liberia's principal food crop today. Rice probably was introduced from Egypt by Mandingo traders who moved south as a result of tribal wars and settled in what is now Liberia. But it also is possible that rice was introduced during the fifteenth century by Portuguese and French traders who patrolled the West African coast, trading goods and rum for slaves, pepper, and palm oil.

Liberian agriculture is a struggle with the bush. Its tools are the cutlass and the hoe. Fire, often used in clearing rice land, saves labor but destroys organic matter and exposes soil to water erosion. Land regularly is abandoned to the bush for several years at a time to permit partial restoration of the organic matter lost through burning, washing, and cropping.

Rice

The long growing season and high temperatures are favorable to rice production in Liberia. Heavy rainfall and high humidity during the growing season also contribute to successful production of rice despite low fertility and poor soil preparation. Annual rainfall ranges from 80 to 175 inches with precipitation heaviest near the coast and diminishing gradually toward the interior.

Rice yields were good in 1949 and the crop was about 200,000 short tons, bringing production and consumption into approximate balance. Production was 160,000 tons in 1948 and 150,000 tons in 1947. Per capita consumption in 1949 averaged 250 pounds. The 1949 prices of $4.50 to $5 per cwt. were stabilized throughout the season, as were those of 1948, thus putting rice within the reach of the average Liberian. Substantial increases in 1949 acreages and yields were noted throughout the Republic. Approximately 800,000 acres were planted to rice and yields averaged 500 to 600 pounds of cleaned rice per acre.

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[*] Based on Foreign Service Reports.

[1] Set up by Foreign Economic Administration: now the responsibility of the State Department.

The principal producing section is the hinterland area of the three Provinces: Western, Central, and Eastern. However, rice is also grown generally throughout the five coastal counties. About 10 percent of the rice is grown in swamps with the remaining 90 percent on upland areas.

About 28 varieties of rice are grown in Liberia. The principal varieties are Gisi, Early Prolific, and Blue Rose. Some of the improved strains were secured from other West African countries, but most of them were imported from the United States by the Firestone Plantations Co. and the United States Economic Mission. Imported varieties showing the greatest promise are listed in order: Guiana, Bida, Gisi, Early Prolific, Blue Rose No. 41, Zenith, Blue Rose × Fortuna, Acadia, Texas Patna, and Caloro.

Primitive methods are used in preparing Liberia's rice lands. The 6- or 7-year-old bush cover is felled beginning in January and is permitted to dry several months before burning. The "scratching" or planting season begins with the approach of the rainy season starting in April, and planting continues through late August. Harvesting is performed by hand with rice heads cut either with a sharp knife or cutlass. The short or "hungry season" crop is gathered during July, while the main crop is harvested from October through December. Threshing and winnowing also are performed by primitive methods.

Some concrete steps are being taken to improve Liberia's rice production. With the aid of the United States Economic Mission, the Liberian Department of Agriculture and Commerce is planning to establish the Gbedin Swamp Rice Demonstration project in the Sanokwelle District this year. It is believed this demonstration will stimulate swamp rice production with modern machinery and fertilizers.

Cassava

Cassava, also called manioc, mandioca, or yuca in some parts of the world, is Liberia's second most important crop. A tuberous starch root grown in many tropical countries, cassava is best known in the United States as tapioca, a processed form of the root. In Liberia, practically the entire crop is consumed as food with little or none used in the manufacture of starch or for cattle feeding. Crop production data are not available, but it is estimated that the 1949 crop approximated 460,000 short tons, compared with 450,000 in 1948 and 410,000 in 1947. Yields, now averaging 2½ to 3 tons per acre, could be increased through the introduction of disease-free, high-yielding varieties and better selection of land.

Cassava grows on all types of soils and may be found planted throughout Liberia. Cassava plantings in recent years have increased both along the coastal belt and in the hinterland area. Monrovia, the capital city, offers a good year-round market for cassava.

Vegetables

The 4-year intensive vegetable-production program fostered by the Economic Mission continued to pay dividends in 1949. As a result of continued technical assistance, good seed, and improved practices, acreages increased throughout Liberia, particularly in the Central Province and Montserrado County, where a few farmers have introduced modern hand tools and

Spraying insecticide on peas in a Mission-sponsored demonstration project.

mechanized equipment in addition to year-round gardens. Favorable weather and increased use of insecticides contributed substantially to good yields throughout the year.

Domestic consumption of fresh vegetables among natives is increasing and marketings through retail channels, principally to Monrovia, Firestone, and Robertsfield, approximated 150 tons as compared with 50 tons in 1948. The main vegetables grown for domestic consumption were cabbage, tomatoes, okra, squash, cucumbers, eggplant, string beans, corn, kale, mustard, turnips, collards, lettuce, sweet peppers, lima beans, and kohlrabi. The leafy vegetables are preferred by the native population.

It is believed that the 80 vegetable-demonstration projects fostered and supervised by the United States Economic Mission in strategic parts of Liberia in 1949 made very definite contributions toward stimulating vegetable production. One outstanding project of 8 acres was located on Bushrod Island, where experiments were conducted in land selection, variety tests, crop rotation, overhead irrigation, pest control, and the use of fertilizers. On January 14, 1949, a field day at the Bushrod Island Project was attended by some 500 persons from nearby villages. As a result of that event, increased activity was observed in most of the nearby settlements.

Tropical Fruits

Tropical fruits occupied an important part of the 1949 agricultural program. Emphasis was placed on such fruits as oranges, grapefruit, limes, lemons, pineapples, mangoes, avocado pears, sapodillas, sour sops, guavas, cherries, and almonds. Biggest gains were noted in Montserrado County and in the Central Province, where some 56,000 scions of these fruits were set out in fields.

Another 60,000 seeds were placed in beds for propagation purposes and will be bud-grafted eventually from improved stock imported by the United States Economic Mission from the Imperial Institute of Tropical Agriculture at Trinidad, British West Indies. At the present rate of planting, it is anticipated that Liberia will produce enough tropical fruit to take care of its needs adequately within another 7 to 10 years.

Vegetable Oils

Palm oil always has been used as food by the Liberian natives. Recently much progress has been made in increasing output and in preparing this oil for domestic consumption and for export. Liberia has never produced enough palm oil for its own needs, but recent observations by the United States Economic Mission indicate that Liberia is moving toward self-sufficiency.

Sorting tomatoes for shipment, Snoho Agricultural Experiment Station.

Poultry

In 1949 a beginning was made in improving Liberia's poultry industry. The United States Economic Mission stimulated interest by encouraging the Liberian Department of Agriculture and Commerce and private poultry raisers to import 300 laying-age pullets and 850 1-day-old chicks from the United States for improvement purposes. Breeds imported were New Hampshire Reds, Barred Plymouth Rocks, and White Leghorns. The New Hampshire Reds seem to have developed more rapidly than the other two breeds under Liberian conditions.

Eggs from the 300 imported pullets now are being hatched. And, if the hatching program proves suc-

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cessful, the importation of baby chicks will be gradually supplemented by domestically hatched birds.

A second phase of the poultry improvement program is the Pedigreed Cockerel Distribution Program sponsored jointly by the Liberian Department of Agriculture and Commerce and the Booker Washington Institute. This program was designed to assist poultry raisers, particularly in the hinterland, to improve their stock by cross-breeding native hens with improved cockerels. During 1949 about 150 pedigreed New Hampshire Red cockerels were imported from the United States and distributed to small farmers at a nominal price.

The agricultural staff of the United States Economic Mission has helped the Liberian Department of Agriculture prepare designs for poultry buildings, home-made brooders, feeders, and other poultry equipment. It also has assisted in the selection of sites and the preparation of balanced rations in which locally grown feeds are used to the maximum extent.

Livestock

Not enough meat is produced to offset a protein deficiency that is common in Liberia. In the Monrovia area, abattoirs slaughter a limited number of cattle and hogs on a twice-per-week schedule. In other coastal cities, livestock is slaughtered weekly. The hinterland is somewhat better off in meat production since natives often kill wild animals and birds, and if there is a surplus over immediate needs it is dried or smoked for future use. This source of meat, however, is falling off as the high bush is cleared.

During 1949 the Liberian Department of Agriculture and Commerce, aided by the United States Economic Mission, imported from the United States two purebred Brahman bulls, one Brown Swiss bull, and one Brahman heifer to be used as foundation stock in a livestock improvement program. In addition, 21 Liberian heifers, some showing good beef conformation and some good dairy form, were bought by the Department of Agriculture and Commerce and private institutions for cross-breeding purposes. It is hoped that this cross-breeding program will result in a tsetse-fly-resistant strain of higher-quality cattle.

Palm oil nuts, sacked for shipment. Liberia is moving toward self-sufficiency in palm oil.

Also imported were two pairs of pure-bred hogs—Hampshires and Durocs. These will be used as foundation stock in developing a swine program.

Fish

Liberian fishing operations are conducted on a primitive basis with equipment consisting of native canoes, home-made fish nets, and raphia fishing lines. The fish hooks are imported. Each canoe carries a complement of from two to four Kru or Fanti fishermen, depending on the canoe's size. These fishermen operate daily during the season (about 6 months) within a 30-mile belt off the coast. Seldom is the daily catch more than the local market can consume immediately. Thus no surplus is accumulated for the off-season months, and the population during those months must depend on imported fish principally from Norway and the United States.

There seems to be a good opportunity for establishment of a modern fishing operation in Liberia. A new cold-storage facility at Monrovia now can supply ice to fishing boats and also receive the surplus catch for freezing. The small surplus that occasionally occurs usually is sun-dried or smoked over a crude Fanti oven and sold during the nonfishing season at exorbitant prices.

It is estimated that 525 fishing canoes are operated along the Liberian coast by 1,200 fishermen consisting mostly of members of the Fanti and Kru tribes. The Fantis immigrate into Liberia from the Gold Coast during the fishing season and return to their native country when the season ends.

The annual catch approximates a few hundred tons of the following varieties: Bonies, barricuda, gruppa, cavalla, mullet, oysters, snapper, cassava, shark, cat, mackerel, sword, butternose, salmon, crawfish, salt water turtle, shrimp, crabs, lobster, clams, pike, and eel. No scientific study has been made of the potential fish take along the Liberian coast. It is believed this one industry, if properly developed, might become an important source of protein food.

Bulgarian Report On Agriculture

Bulgaria's agricultural progress is severely criticized in a decree issued January 20, 1950, by the Ministerial Council of the Central Committee of the Bulgarian Communist Party. The decree is unique in its documentation of alleged shortcomings of the Ministry of Agriculture.

The first part of the report praises the collective system and gives thanks to "the disinterested and friendly help given to Bulgaria by the Soviet Union." The major part of the decree, however, is given over to a listing of the failures of the Bulgarian Ministry. The body of the criticism is quoted as follows: [1]

"The Ministry of Agriculture has still not become a true leader—one that successfully conducts the development of all branches of agriculture throughout the Republic. The Ministry has not solved the important problems of the moment about the development of cereal production, technical cultures and animal breeding; it does not mobilize the attention and does not organize enough its local officials in connection with the problems of raising the yields from agricultural plants, raising the productivity of animals, and creating raw materials for industry.

"The Ministry continues to a large extent to work applying the old methods, as adviser and not as a leader and organizer of rural economy. It has not succeeded after the establishment of the people's regime, after the formation of LCFs, and MTSs [2] and State farms, to change radically the system of administration.

"The development of the new forms of farming—MTSs, State farms and LSFs—the desire of thousands of peasants to set up new LCFs, the large irrigation schemes of the State do not reduce but increase the responsibilities of the organs of the Ministry of Agriculture for conducting agriculture. It is not sufficient now to advise and to carry out some undertakings just to impress the peasants, it is not sufficient to work out plans, what is needed are everyday cares and practical conducting of the multilateral development of rural economy.

"The enrollment of thousands of farmers in the LCFs, the formation of MTSs and State farms multiply the cares of the State for agriculture and requires a firm organization of the services of the Ministry of Agriculture from top to bottom.

"The Ministry of Agriculture does not sufficiently explain and popularize the experience of advanced LCFs, does not organize enough visits of private farmers to well-organized cooperative farms, does not take the necessary steps for the scientific organization of the LCFs, for the introduction of correct rotation of crops. The Ministry has organized few animal breeding farms; it has not taken measures for the application of advanced agrotechnical methods in the LCFs, insufficiently popularizes the experience of the best brigades in all LCFs.

"The Ministry of Agriculture does not assist enough the administrative boards and presidents of LCFs, does not instruct them enough how to conduct large farms; it unsatisfactorily trains cadres for the LCFs and pays little attention to their political education.

"The Ministry permits serious weaknesses in the work of MTSs. The Ministry has not assured the full use of the tractors and agricultural machines in field work; tractors are left idle; their repairing is badly organized; fuel and lubricants are allowed to be wasted; the periods of time are extended; often ploughing, sowing and other works are carried out unsatisfactorily from an agrotechnical point of view.

"The Ministry of Agriculture has not yet turned the State agricultural farms into model State farms, has not introduced in most of them proper rotation of crops, allows the tilling of land by means of unsatisfactory agrotechnical methods; has not assured the collection of abundance in the State agricultural farms and a high productivity of animals.

"The Ministry of Agriculture allows great mistakes to occur in the conducting of private farming and gives not enough support to the poor and middle-class farms.

"Thousands of peasants continue to till their land with primitive ploughs, apply hand-sowing, while the stores of 'Zemsnab' are full of unused and unsold thousands of agricultural machines and tools, which is a great loss for both State and farming.

"The sowing areas continue to be perfunctorily included in the plan for the districts and farms. The terms for completing various works in the fields are extended; the use of water for irrigation is badly controlled; fertilizers are used insufficiently.

"The enumerated weaknesses in the work of the

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[1] The complete report has been published as a Foreign Agriculture Circular and is available upon request to the Office of Foreign Agricultural Relations, U. S. Department of Agriculture, Washington 25, D. C.

[2] LCFs are labor cooperative farms and MTSs are motor tractor stations.

Ministry of Agriculture and farming are reflected in the low yields from cereal, oil-giving, cotton, flax, hemp crops and animal produce, etc., which creates serious difficulties in supplying the population with bread and industry with raw materials.

"The Ministry of Agriculture has failed to work out a plan for surveying the farms and for concentrating certain plants in certain areas, and has not made a proposal to that effect to the Government. The land is mechanically distributed in areas designed to be sown with various plants, without a serious knowledge of the economic, natural, soil and climatic conditions of the various areas.

"The Ministry of Agriculture most insufficiently prepares and submits for approval to the Government and the CC of the BCP[3] proposals on the most important issues for the development of agriculture and animal breeding, shows little initiative for solving the State problems in rural economy.

"Our textile industry meets with great difficulties as regards cotton supply and works chiefly with raw materials imported from the Soviet Union, but the Ministry of Agriculture has not so far prepared plans for intensifying cotton output in this country, increasing the yields and improving the quality of cotton, development of cotton cultivation on irrigated fields, for creating material stimuli for cotton growers and has not submitted such plans for approval to the Government and the CC of the BCP.

"Our industry meets great difficulties to obtain fine and semirough wool for the production of finer woolen yarns, and the Ministry of Agriculture has not yet prepared a plan and has not taken steps for the development of breeding of sheep which give wool of a finer thread and for the encouragement of sheep breeders who supply the State with good-quality wool.

"The Ministry of Agriculture does not conduct properly and insufficiently directs the work of scientific research institutes toward solving the practical tasks in the realm of farming. The scientific institutes have not established a close contact with production, with MTSs, LCFs, and State agricultural farms and peasants with rich experience; they do not submit enough proposals for raising the yields of plants and the productivity of animals.

"The new tasks facing the rural economy of the Republic impose upon the Ministry of Agriculture a heavy responsibility for its taking the real lead in developing all the branches of agriculture and animal breeding, in studying down to the ground the needs of the various LCFs and State agricultural farms, in getting rid of the bureaucratic methods of work and turning the Ministry into headquarters really leading the development of rural economy.

"Simultaneously with all that, the Ministerial Council and the CC of the BCP note that many district committees of the BCP insufficiently direct farming and do not give the necessary assistance to the local organs of the Ministry of Agriculture, do not direct and control their work."

To alleviate these shortcomings, the Ministerial Council ordered 12 corrective measures put into effect immediately. The last part of the report is a detailed account of these measures.

INTERNATIONAL *Agricultural News*

Colombian Veterinarian Studies in United States

Dr. Facion Cormane, head of artificial insemination work for the National Livestock Division of Colombia, is now in the United States for a course of training that will include periods at North Carolina State College, University of Missouri, Rutgers University, Ohio State University, and the Southern Regional Livestock Disease Laboratory at Auburn, Ala.

He comes here under a cooperative agreement that has been worked out between the Livestock Division of Colombia and North Carolina State College together with the Departments of Agriculture of both countries and the United States Department of State—a project that should notably advance animal research and cattle improvement programs. It is being implemented, in part, by the exchange of livestock technicians; already Dr. H. A. Stewart, of North Carolina State College, has been in Colombia working with the Colombian Livestock Division there to help organize the technical aspects of the program.

Chief feature of the program is the exchange of semen of leading breeds of cattle: North Carolina is receiving the semen of the Romo-Sinuano breed; Colombia, that of Holstein, Jersey, Aberdeen Angus, Shorthorn, and other United States breeds.

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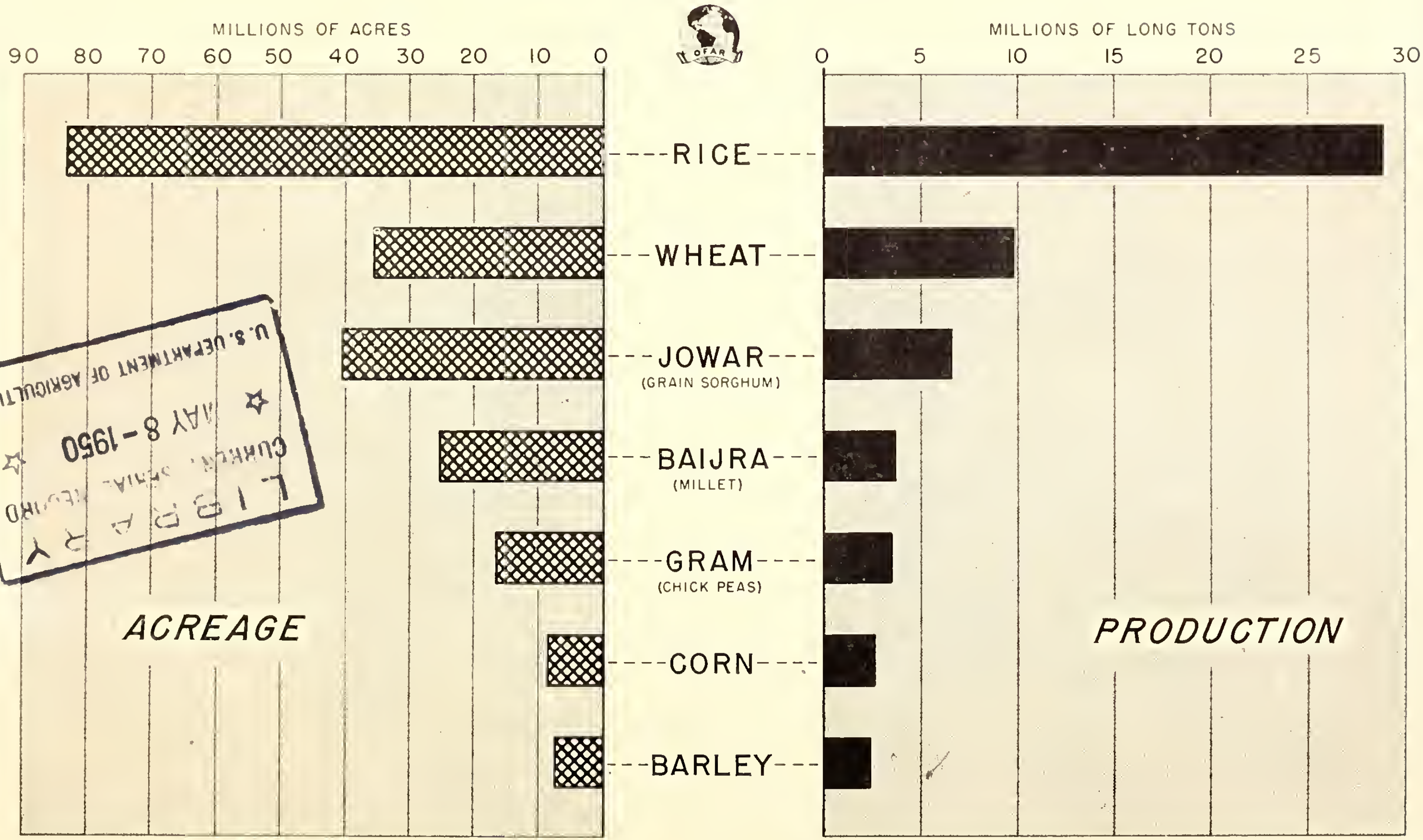
[3] Central Committee of the Bulgarian Communist Party.

INDIA: ACREAGE AND PRODUCTION OF SEVEN FOOD GRAINS
AVERAGE 1943/44 – 1945/46*



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